

REMARKS

This paper is in response to the Office Action dated December 22, 2003. The due date for response extends to April 22, 2004, with the enclosed one month extension.

The Examiner is thanked for the detailed nature of the rejections including cites to places in the text of the references, and interpretations of the references.

Summary: By this amendment and response, the rejections of paragraphs 1 and 2 (re Figs. 2, 5 and 6, first one) are overcome by amendments to the specification. The paragraph 3 rejection to unidentified Figure (which is Figure 6) is set forth in accompanying separate sheet of Figure 6 (with the corrected arrow). Approval of this proposed amendment is respectfully requested. Claims are renumbered correctly, and claims 9, 10, and 21 are amended in view of the rejections in respective paragraphs 5-7. Arguments are made in response to the rejections based on art.

Response To Rejections In Re Specification Informalities (Including Drawings): The above amendments to the specification include all of those kindly noted by the Examiner. Also, the paragraph at page 3, starting at line 12 is amended to correct the reference to the host 216 (referred to originally as "316") to conform to that shown in Figure 2, overcoming the rejection of Figure 2 in re reference sign 216. Also, the paragraph at page 16, starting at line 17 is amended to add a reference to the operation 508 shown in Figure 5, overcoming the rejection of Figure 5 in re reference sign 508. Also, the paragraph at page 17, starting at line 3 is amended to add a reference to the decision operation 512, overcoming the rejection of Figure 5 in re reference sign 512. Also, the paragraph at page 17, starting at line 16 is amended to add a reference to the flow chart 600, overcoming the rejection of Figure 6 in re reference sign 600. Since the amended text refers to what is shown in the respective Figures, no new matter is added, and entry of the amendments is respectfully requested.

Response To Rejection of Drawings: In addition to the drawing rejections noted above, Figure 6 has been amended to correct the arrow between block 618 and diamond 612. Approval of the amendment to Figure 6 is respectfully requested.

Numbering of Claims: Claims 28-30 have been amended and now correct the numbering, so that former claim 28 now is claim 27, etc. Claim 9 now recites proper details of the bus of each of the respective first and second bus segments. Claim 10 has been amended and is now dependent on device claim 9. Claim 21 has been amended to correct the error kindly noted in the rejection. Approval of these amendments to the claims is respectfully requested.

Response To Rejections Based on House and Looi: Claims 1-8, and 10, 13, 16, 18, 22, 25, 28, and 29, were rejected under 35 USC 103(a) based on House taken with Looi (and with other references to Ehata and IBM). Reconsideration of these rejections is respectfully requested for the following reasons.

The references applied to the claims have been reviewed to determine what is taught as a whole, as is required in such cases as Bausch and Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 USPQ 2d 416 (Fed. Cir. 1986). This includes placing statements in the references in context, and giving meaning to them as they would mean to one skilled in the art having no knowledge of Applicants' invention. Also, review of the proposed combinations of references has been made from the standpoint of whether one skilled in the art would be motivated to combine the references, or whether the references teach away from the claimed combination.

Review of Claimed Invention:

The claimed method and apparatus resets bus segments to clear bus hang in an I/O subsystem having a plurality of bus segments. The resetting is done on a bus segment-by-bus-segment basis. Each bus segment in the I/O subsystem includes a set of devices and a bus that is coupled to the set of devices. In addition, the I/O subsystem includes at least one expander, each expander being arranged to couple the bus of one bus segment to the bus of the other bus segment for propagating communication signals. Thus, by the expander, a first bus of a first bus segment may communicate with a second bus of a second bus segment. A reset signal is asserted on the first bus segment. In response to the reset signal, each expander coupled to the first bus segment and each device in the first bus segment reset themselves. Additionally, each expander coupled to the first bus segment isolates

the reset signal such that the reset signal is not propagated to the other bus segments, i.e., not to the second bus segment. Thus, for each expander coupled to the first bus segment, all communication signals are isolated such that each expander prevents propagation of the communication signals between the first bus and second bus. Then, it is determined whether the second bus is no longer hung for each expander coupled to the first bus segment. If the second bus is still hung, each expander issues a far-side reset signal on the other bus to reset the other bus. However, if the other bus is not hung, communication signals are allowed to propagate between the first bus and the other bus. By these multiple and sequential operations, the functioning of the second bus segment is not interfered with by the reset signal from the first bus segment. Further, after the reset of only the expander and devices of the first bus segment, the functioning of the second bus segment is determined, and only if that second bus segment is hung will that second bus segment be reset, and if not hung, the second bus segment may be used by changing the isolation to permit communication signals from the first to the second bus segment.

Review of House As A Whole:

The rejection relates House to the elements set forth in the preamble of claim 1, for example. At page 5 of the Action (top of page), it is noted that House does not expressly teach two of the claimed steps [a) and b)] of the six steps claimed. Only by reference to the discussion of House taken with Looi is it apparent that House also does not teach the claimed step c1). Further, only by reference to the discussion of House taken with Looi and taken with Ehata (page 6) is it apparent that House also does not teach the claimed step c1) or c4). It is respectfully submitted that House not only does not teach the claimed method steps, but House does not appreciate Applicants' problem nor the claimed solution to that problem. Rather, House only wants to provide an interface that will support more peripherals while maintaining reliable connectivity with a host computer. Further, House does not recognize that bus segments should be isolated, the extender 30 does not do any bus segment isolation, and (C11, L44+) simply waits for a bus free phase. As a result of these goals and teachings of House, and the lack of appreciation of Applicants' problem, it is respectfully submitted that House would not motivate one skilled in the art to seek any solution to Applicants' problem.

Review of Looi As A Whole:

Considering Looi, the Action asserted (in re claims 1-8) that Looi's method relates to a first bus segment, which is said to be bus 61, Fig. 1. However, in the rejection, no mention is made as to a Looi disclosure of a second bus segment, which is shown in Figure 2 and described at C5, L14+. There, Looi clearly teaches a second bus segment (71, 72, with related devices), including the expander bridge 70. Significantly, the Action did not acknowledge that the **direct teaching** of Looi is that expander 70 is "operably coupled to ...expander 60...and is reset concurrently therewith" (C5, L47-48). Rather, with reference only to Figure 1, the Action (page 5) stated that

"House, as modified by Looi, does not teach expander coupled to said first bus segment isolates said reset signal such that said reset signal is not propagated to the other bus segments."

Significantly, this quoted statement does not state what Looi expressly teaches against applicants' claimed invention. In detail, the quoted statement does not note that Looi shows the **direct connection** between expansion bus 62 (of the first bus segment) and a reset control input 67, and does not note that C5, L57+ make it clear that not only is there no isolation between the first bus segment 60, 61, 62 and the second bus segment 70, 71, 72, but that such direct connection acts to reset both the expansion bus 62 and the devices of the expander bridge 70 in response to the local bus reset signal 69 (C5, L60-65). It is respectfully submitted that this underlined teaching is not merely an absence of a teaching (absence of "isolation"), as implied by the words of the rejection relating only to Looi's Figure 1. Rather, this teaching is a teaching away from the claimed isolation of the first and second bus segments. Thus, the situation based on these two references as a whole is that House does not provide the requisite motivation to combine, and the other (Looi) reference teaches away from the claimed isolation of the first and second bus segments, and thus away from the proposed combination. In view of this, it is respectfully submitted that it is not proper under the 35 USC 103 standard to combine House and Looi, and withdrawal of the rejections of claims 1-8, and 10, 13, 16, 18, 22, 25, 28, and 29, based on such combination is requested.

Review of Looi As A Whole: Claims 10 and 22:

Considering Looi again, the Action asserted (in re claims 10 and 22) that Looi discloses an individually resettable bus expander bridge mechanism, wherein an expander resets an expander device in response to a reset signal. Note was made that all devices in a first bus segment were reset in response to the reset signal. However, in the rejection, no mention was made as to the Looi disclosure of the second bus segment, which is shown in Figure 2 and described at C5, L14+. There, as noted above, Looi as a whole clearly teaches a second bus segment (71, 72, with related devices), including the expander bridge 70. Significantly, the Action did not acknowledge that the **direct teaching** of Looi is that expander 70 is "operably coupled to ...expander 60...and is reset concurrently therewith" (C5, L47-48). Significantly, the rejection does not consider that Looi expressly teaches against applicants' claimed invention of parent claims 9 and 21. In detail, the rejection does not note that Looi shows the **direct connection** between expansion bus 62 (of the first bus segment) and a reset control input 67, and does not note that C5, L57+ make it clear that not only is there no isolation between the first bus segment 60, 61, 62 and the second bus segment 70, 71, 72, but that such direct connection acts to reset both the expansion bus 62 and the devices of the expander bridge 70 in response to the local bus reset signal 69 (C5, L60-65). It is respectfully submitted that this underlined teaching is again a teaching away from the claimed isolation of the first and second bus segments of parent claims 9 and 21. Thus, the situation based on these two references as a whole is that House does not provide the requisite motivation to combine, and the other (Looi) reference teaches away from the claimed isolation of the first and second bus segments, and thus away from the proposed combination. In view of this, it is respectfully submitted that it is not proper under the 35 USC 103 standard to combine House and Looi, and withdrawal of the rejections of claims 10 and 22 based on such combination is requested.

Response To Rejections Based on House and Ehata: All claims were rejected under 35 USC 103(a) based on House in view of Ehata (and in view of IBM_TDB, and in re claims 1-8 in view of Looi). Reconsideration of these rejections is respectfully requested for the following reasons.

Review of House As A Whole:

The rejection relates House to bus segments, devices of those bus segments, and to an expander, of claims 9 and 21, for example. At page 9 of the Action, as to claim 9 it is noted that that House does not teach an expander controller including a reset and segment isolation controller for isolating a reset between a pair of bus segments. Only by reference to the discussion of House taken with Ehata is it apparent that House also does not teach the claimed isolation of all signals to prevent propagation between first and second bus segments until the bus in the second bus segment is cleared from a hang condition. At page 111 of the Action, it is noted as to claim 21 that House does not teach an expander controller including a reset and segment isolation controller adapted to isolate a reset signal received on the first bus segment from propagating to a second bus segment, i.e., a reset device for resetting bus segments to clear bus hang.

It is respectfully submitted that House as a whole not only does not teach the claimed isolation of all signals, and does not teach isolation controller adapted to isolate a reset signal received on the first bus segment from propagating to a second bus segment, but as noted above, House does not appreciate Applicants' problem nor the claimed solution to that problem. Further, because of these teachings, there is no basis in House on which to assert that House would motivate one skilled in the art to seek any solution to Applicants' problem.

Review of Ehata As A Whole:

The remarks below show that Ehata as a whole has features not acknowledged in the rejections, and that the teachings of those features are contrary to the claimed invention.

First, the goal of Ehata is understood by reference to paragraph 0005 and Figures 1 and 3. The Figures show one bus segment comprised of bus 3, many SCSI devices 2, and one host CPU 1. Paragraph 0005 states that the problem is that when a hang-up occurs (e.g., in re one SCSI device 2) not only the hung-up device is reset, but so is "the SCSI device which has not hung-up..."

Considering Ehata as a whole, it is noted that all of this resetting occurs only in the one disclosed bus segment (comprised of bus 3, many SCSI devices 2, and one host CPU 1). Further, Ehata does not describe or show any other bus segment comprised of bus 3, many SCSI devices 2, and

one host CPU 1, for operation (via an extender) with the first noted bus segment shown in these Figures. In contrast, not finding two clear claimed bus segments, the rejection breaks that one Ehata bus segment up into many asserted “bus segments”, all of which are parts of the one described “one bus segment comprised of bus 3, many SCSI devices 2, and one host CPU 1”.

In detail, the Action asserted (in re claims 9 and 21) that Ehata discloses a reset and segment isolation controller. With respect to claim 9 that controller was in the form of inverter circuit 71 and OR circuit 72 (Fig. 2), and with respect to claim 21 that controller was in the form of the circuit 7 (page 11). Each was said to isolate a reset signal (the RST signal 6) said to be “received... on a first bus segment (e.g., a hung-up SCSI device shown in Fig. 1)”. It was also said that the **isolation** of that reset RST signal 6 received on the first bus segment is **isolating from propagating to a second bus segment. That second bus segment was identified as a not hung-up SCSI device in Fig.1).** It was further said that:

“such that an expander device ...for isolating a reset (i.e., RST signal)
between said pair of bus segments in an I/O system...”.

It was not stated that such isolation controller is or is not part of the “second bus segment” (the not hung-up device). By the quoted text, it was asserted that such a controller 71/72 (or circuit 7) of Fig. 2 is generally for isolating a reset (RST) signal between a pair of bus segments.

Initially, it is respectfully submitted that the asserted Ehata first and second bus segments do not correspond to the claimed pair of first and second bus segments. The reason is that the asserted bus segments of Ehata are only the devices 2 (#1, #2, etc., one hung-up, one not) of Figs. 1 or 3. A device 2, per se, of Ehata is not the claimed “each bus segment having a set of devices and a bus that is coupled to the set of devices”. Those asserted bus segments (devices 2) either generate a BSY signal which the bus 3 transmits to another device 2, or receive both a BSY signal and a RST signal (e.g., from the host 1 via the bus 3). Because the bus 3 is connected to each device 2 (Figs. 1 and 3) there is no claimed expander controller between I/O circuits to isolate the RST signal received on the first bus segment (at one device 2) from propagating to the second device 2. Rather, the bus 3 serves to propagate the RST signal 6 between all of the devices.

Secondly, there is no assertion in the rejection (pages 9 and 11) that Ehata shows the claimed

separate first and second I/O circuits that interface with the asserted respective first and second bus segments. Ehata as a whole indicates this lack of the claimed separate first and second I/O circuits that interface with the asserted respective first and second bus segments. For example, in the context of the claimed two I/O circuits and the claimed expander controller between those two I/O circuits, in Ehata only the bus 3 is between the various devices 2 (Figs. 1 and 3). As noted above, as a result the bus 3 always connects the various SCSI devices 2 to each other, and the bus 3 always communicates communication signals between the various devices 2 (e.g., #1 device 2, #2 device 2, etc.).

Further, still viewing Ehata as a whole, the asserted Ehata reset and segment isolation controller (71/72) is described by Ehata as being part of a reset-condition judging circuit 7 (as cited in re claim 21). Each such circuit 7 is contained within one of Ehata's SCSI devices 2, which may be any one of #1, #2, #3 (Fig. 1) or #n, Fig. 3. Clearly, each such SCSI device 2 (#1, etc.) is connected only to one and the same bus 3 of the one and the same disclosed bus segment that includes bus 3. One connection of bus 3 to the SCSI device 2 supplies the BSY signal 5 to the circuit 7. Such supply may be from receiver 51 and the BSY terminal of a BSY controller 4 of the BSY device 2. Such supply may also be from another device 2 via the bus 3. It is clear that circuit 7 always receives the RST signal 6 from the host 1 if the host is sending that RST signal 6. For example, see Ehata claim 3, and the RST signal 6 is applied to the "AND" circuit 73. In contrast, as claimed, the expander controller is between the two claimed I/O interface circuits, one of which is connected to the first bus segment and one to the second bus segment.

After the abbreviated description of Ehata, the rejection attempted to justify the combination of Ehata with House because of an asserted Ehata "selectively reset only a bus segment (i.e., a SCSI device) which has hung up" by receiving a reset signal and "resetting said hung-up bus segment when said hung-up bus segment is outputting a busy signal...". It is respectfully submitted that to so characterize Ehata by equating a SCSI device with the claimed and defined bus segment improperly ignores the clear, as a whole teaching of Ehata of only one of the claimed "bus segments". As noted, the goal of Ehata relates to only that one bus segment comprised of bus 3, many SCSI devices 2, and one host CPU 1. The problem identified by Applicants is not appreciated by Ehata. In Ehata, the problem solved was a situation in which a hang-up occurs in re one SCSI device 2 of that one bus

segment, not only the hung-up device of that one bus segment is reset, but also there was reset of the other not hung-up SCSI device of the same bus segment. Ehata solves Ehata's unique problem by not resetting that other not hung-up device 2. That not resetting is the direct opposite of claim 10, for example, in which all of the devices of the first bus segment are reset in response to the reset signal.

As noted, the Action asserted that the reset signal 6 is received on a first bus segment (a hung-up SCSI device shown in Fig. 1, e.g., #1 device 2). It was asserted that an expander device isolates the reset RST signal 6 from propagating to a second bus segment (the not hung-up device, Fig. 1, e.g., #2 device 2). Viewing Ehata as a whole, the expander device that is to do the isolation from propagating must be part of that #2 not hung-up device 2 itself, because that #2 not hung-up SCSI device 2 is the asserted second bus segment. Moreover, any asserted isolation of the reset RST signal 6 must be isolation between the bus 3 (from which the RST signal 6 is received by #2 SCSI device 2) and the SCSI controller 4 of that #2 SCSI device 2 (which receives or does not receive an output from AND circuit 73 according to an input from OR circuit 72 and the RST signal 6). It follows then, that the asserted second bus segment (to which propagation is to be isolated) must not only be internal to the #2 device 2 (i.e., internal to the not hung-up #2 SCSI device 2), but be after the "circuit" (#7) that is to do the isolating. Thus, the asserted expander device that is to do the isolating must be the "reset-condition judging device 7". However, in the context of claim 9, that #2 device 2 is part of one and the same claimed "bus segment".

The rejection acknowledged that even as combined, House and Ehata do not teach

"said expander controller isolates all signals to prevent propagation of said signals between said first and second bus segments after isolating a reset signal until said bus in said second bus segment is cleared from a hang condition."

In this regard, it is noted that the asserted second bus segment must be limited to only part of the not hung-up device 2 (i.e., to the SCSI controller 4), and that the RST signal is isolated from that not hung-up SCSI controller 4 because it is not hung-up and Ehata wants that not hung-up device to continue to operate. It is respectfully submitted that it is contrary to Ehata's teachings to isolate an operating SCSI device 2 (not hung-up) from all signals, because the whole purpose of not applying that one reset RST signal 6 to the operating SCSI device 2 is to allow that operating, not hung-up device 2 to continue to operate independently of the hang-up of the other SCSI device 2 on that same bus segment (that

includes the bus 3). Thus, consistent with the way Ehata is asserted, Ehata directly teaches that after isolating the reset signal from the not hung-up device 2, one should allow all signals to be applied to that operating, not hung-up device 2 so as to allow it to operate, e.g., in response to communication signals. As asserted, by allowing other signals from the bus 3 to reach the not hung-up device 2, Ehata teaches away from the claimed

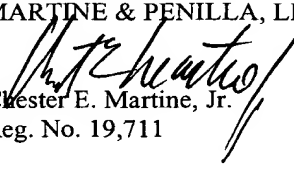
“said expander controller isolates all signals to prevent propagation of said signals between said first and second bus segments after isolating a reset signal until said bus in said second bus segment is cleared from a hang condition.”

Thus, the situation based on these two references as a whole is that House does not provide the requisite motivation to combine, and the other (Ehata) reference teaches away from the claimed isolation of all signals to prevent propagation of said signals between the first and second bus segments after isolating a reset signal until the bus in the second bus segment is cleared from a hang condition. In view of this, it is respectfully submitted that it is not proper under the 35 USC 103 standard to combine House and Ehata. Since all claims were rejected based on that combination, withdrawal of the rejections of all claims based is respectfully requested.

In view of these amendments and remarks, it is believed that all claims are allowable, and a notice of allowance is respectfully requested.

If the Examiner has any questions concerning the present amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900, ext. 6908. If any other fees are due in connection with filing this amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. ADAPP189). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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